

THE GENERIC VALIDITY OF *AENIGMOSTOMUS* AND
ASIACARDIOCHILES (HYMENOPTERA: BRACONIDAE)

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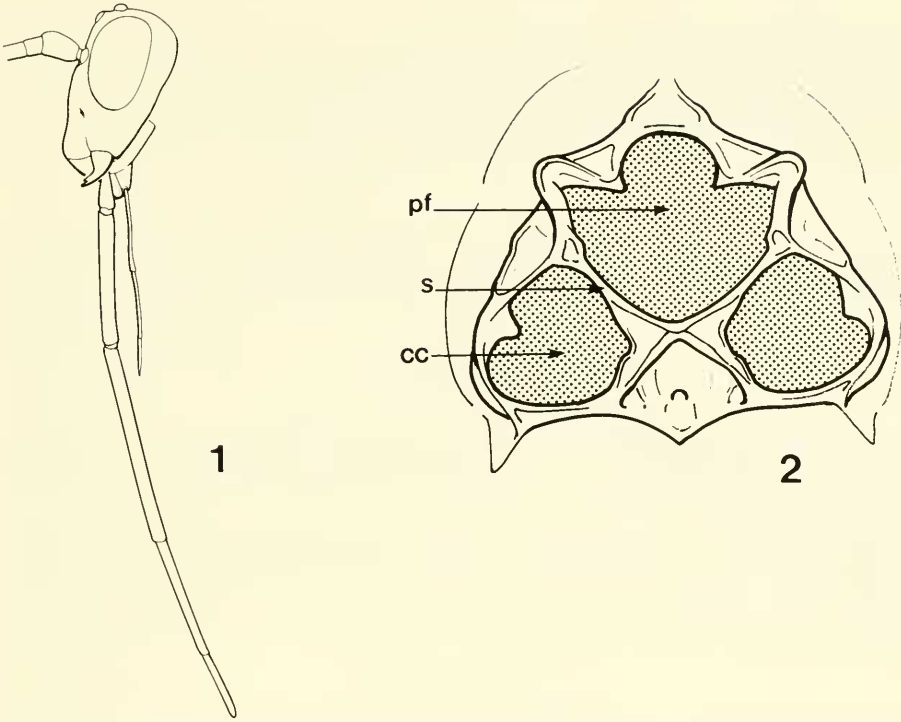
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Abstract.—The braconid genera *Aenigmostomus* and *Asiacardiachiles* are both shown to be highly apomorphic forms of the large and widespread genera *Agathis* and *Cardiachiles*. Accordingly, *Aenigmostomus* is a new junior synonym of *Agathis* and *Asiacardiachiles* a new junior synonym of *Cardiachiles*.

We wish to correct the generic placement of *Aenigmostomus longipalpus* Ashmead and *Asiacardiachiles minutus* Telenga, both of which are the basis of monotypic genera, for three reasons. First, we are preparing a paper on the comparative and functional morphology of palpal drinking tubes in the Braconidae that will include these two species. Second, Marsh et al. are currently preparing a key to the genera of the Braconidae in America north of Mexico and we wish to justify the exclusion of *Aenigmostomus* from this key. Finally, we wish to draw attention to a large widespread problem, namely monotypic groups erected for species that have very striking and aberrant features but that are otherwise typical members of larger taxa. The problem is easily recognized as an elementary one in phylogenetic analysis (Wiley, 1981, p. 83-89); nevertheless, it seems firmly embedded in generally accepted classifications. Many well known genera and families are paraphyletic because aberrant derived species are recognized at a hierarchical level equal to the parent group.

Aenigmostomus Ashmead and *Asiacardiachiles* Telenga were erected to accommodate rather odd looking species, *Aenigmostomus longipalpus* and *Asiacardiachiles minutus*. Both species differ from their nearest relatives by having very elongate mouthparts. Those of *A. longipalpus* are especially long (Fig. 1). Undoubtedly, *Aenigmostomus* and *Asiacardiachiles* were created because their authors had the opinion that the two species were so different they must represent new genera. In other words, these genera were erected to reflect great anagenetic change rather than to show cladistic or phylogenetic relationship. In this paper we try to demonstrate that the exclusion of *Aenigmostomus* from *Agathis* s.s. renders the latter genus paraphyletic. Similarly, separating *Asiacardiachiles* from *Cardiachiles* leaves *Cardiachiles* paraphyletic, unsupported by synapomorphic characters.

Agathis does not possess any synapomorphies not also shared by *Aenigmostomus* and it is doubtful that *Aenigmostomus* forms the sister group of *Agathis*. *Aenigmostomus longipalpus* and a group of *Agathis*, including *A. malvacearum* Latreille, have a narrow sclerite separating the hind coxal cavity from the pro-



Figs. 1, 2. *Aenigmostomus longipalpus*, lateral view of head. 2, *Agathis malvacearum* Latr., posterolateral view of metasoma illustrating narrow sclerite between hind coxal cavity (cc) and propodeal foramen.

podeal foramen. We hypothesize this to be a synapomorphy for a subgroup within *Agathis*. The plesiomorphic condition is that the hind coxal cavities and the propodeal foramen are contiguous. This condition is found in many species of *Agathis*, e.g. *A. rubripes* Cresson, and all species of *Earinus*, the outgroup. For a discussion of the generic limits of *Agathis*, see Sharkey (1985).

Cardiochiles and *Asiacardiochiles* are extremely similar. The only feature by which the single species of *Asiacardiochiles* differs from over a hundred species of *Cardiochiles* is the extremely large and elongate glossa, reaching to the hind coxa or beyond. The glossa is much shorter in other *Cardiochilinae*, at the longest scarcely reaching the forecoxa.

Three characters can be interpreted as synapomorphies linking *Cardiochiles* and *Asiacardiochiles* and differentiating them from the other *Cardiochiline* genera: 1. Hairy eyes; all other *Cardiochiline* genera (i.e. *Toxoneuron*, *Tenthredoides*, *Psilomiscus*, *Pseudocardiochilus*, *Hartemita* (= *Laminitarsus*), *Heteropterion* (= *Neocardiochiles*), *Wesmaelella*) have glabrous eyes and it is also the most widespread character state within the Braconidae. 2. Apical margin of clypeus with a pair of median denticles; this character state is found in *Psilomiscus* as well as *Cardiochiles* and *Asiacardiochiles*, but all other *Cardiochilinae* have a simple convex outline for the apical margin of the clypeus. The simple condition is very widespread in Ichneumonoidea and other Hymenoptera and should be interpreted

as the plesiomorphic state. 3. Hypopygium with a median longitudinal zone of desclerotization and folding; about half the genera of Cardiochilinae have the hypopygium evenly sclerotized and unfolded medially, a condition that is by far the commonest and most widespread in Hymenoptera and should thus be interpreted as plesiomorphic. Other synapomorphies, uniting all Cardiochilinae, are given by Mason (1983).

The mesopleuron of most species of *Cardiochiles* has a coarsely foveate broad groove running obliquely upward from above the midcoxa nearly to the pronotum. This groove varies greatly in depth, width, length and type of sculpture but it is an extremely widespread feature in almost all groups of Braconidae. The widespread presence of this groove strongly suggests that it is a ground plan character state of the Braconidae. In *Asiacardiochiles minutus*, *Cardiochiles eremita* Kokujev and *C. explorator* (Say) the mesopleuron is smooth and even, the oblique groove being represented by no more than the slightest flattening in the general convexity of the surface. These three species share two other character states that are unusual for *Cardiochiles*: the second tergite is without the usual longitudinal grooves that delimit a median raised area and the usually abundant tarsal pectination is reduced to one broad tooth and three small narrow teeth. Based on these character state distributions we hypothesize that the three species form a monophyletic group within *Cardiochiles*.

ACKNOWLEDGMENTS

We thank H. Goulet and J. D. Lafontaine for their reviews of the manuscript and Ms. Rigby for drawing Figs. 1–2.

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